

REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY.

BY

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PART XIX.

(With 9 plates.)

(Continued from page 736 of Volume XXXV).

ORCHIDACEAE.

BY

E. BLATTER, S.J., Ph.D., F.L.S. & C. McCANN, F.L.S.

37. HABENARIA Willd.

Species about 500.—Temperate and tropical countries.

Cooke mentions 17 species from the Bombay Presidency. Of these *H. subpubens* is being reduced and united with *H. Heyneana*. *H. digitata* as conceived by Cooke is split up into *H. digitata* Lindl. and *H. Gibsoni*; the variety *foliosa* is restored to the rank of a species. Sedgwick has described a new species: *H. multicaudata* and we add 5 new ones: *H. Spencei*, *H. grandifloriformis*, *H. variabilis*, *H. cerea* and *H. Hallbergii*, and one new to the Presidency, *H. ovalifolia*.

Key based on Cooke:

- A. Petals 2-partite. Lip 3-lobed or 3-partite
- I. Sepals with filiform tips 1. *H. stenopetala*.
- II. Sepals not filiform at the tips
1. Lower segment of petals shorter than the upper
- a. Petals bipartite nearly to the base ... 2. *H. digitata*.
- b. Petals deeply 2-cleft 3. *H. foliosa*.
2. Segments of petals subequal 4. *H. Gibsoni*.
3. Lower segment of petal longer than the upper
- a. Leaves more than one, not roundish
- * Lobes of lip filiform, fantastically contorted 5. *H. multicaudata*.
- ** Lobes of lip linear 6. *H. Spencei*.
- *** Lobes of lip: lateral filiform, longer than the broader linear obtuse midlobe 7. *H. rariflora*.
- b. Leaves 1 or 2, both or at least the lower roundish
- * Lip 22 mm. long 8. *H. grandifloriformis*
- ** Lip 12 mm. long 9. *H. grandiflora*.
- B. Petals entire
- I. Side lobes of lip broader than the midlobe
1. Lip deeply 3-lobed or 3-partite, not or hardly longer than the lateral sepals
- a. Side lobes of lip small, rounded ... 10. *H. platyphylla*.
- b. Side lobes of lip large, obliquely truncate and denticulate at apex ... 11. *H. suaveolens*.
2. Lip deeply 3-lobed or 3-partite, much longer than the lateral sepals
- a. Lobes of lip not tailed
- * Spur 11 mm. long, lateral sepals 14 mm. long 12. *H. variabilis*.
- ** Spur reaching 10 cm. long, lateral sepals 12 mm. long 13. *H. longicalcarata*.
- *** Spur 3 cm. long, lateral sepals 5 mm. long 14. *H. plantaginea*.
- b. Lobes of lip with long filiform tails ... 15. *H. erinifera*.

- II. Side lobes of lip not broader than the midlobe
1. Tubes of the anther-cells long ... 16. *H. commelinifolia*.
 2. Tubes of the anther-cells short
 - a. Stem leafy upwards
 - * Bracts much shorter than the flowers 17. *H. cerea*.
 - ** Bracts exceeding the flowers ... 18. *H. Heyneana*.
 - b. Leaves 3-6, clustered towards the middle or at the base of the stem
 - * Bracts as long as or longer than the ovary
 - † Leaves green throughout, placed near the middle of the stem
 - ¶ Side lobes of lip narrow, longer than the linear obtuse midlobe 19. *H. affinis*.
 - ¶¶ Side lobes linear-oblong, incurved, as long as or shorter than the ovate-oblong fleshy midlobe ... 20. *H. ovalifolia*.
 - †† Leaves placed near the base of the stem
 - § Leaves with narrow yellowish margins ... 21. *H. marginata*.
 - §§ Leaves without yellowish margins ... 22. *H. Hallbergii*.
 - ** Bracts much shorter than the ovary, leaves placed near the base of stem ... 23. *H. viridiflora*.
 - c. Leaves 2 (rarely 3), radical or opposite on the stem, broadly ovate or suborbicular, cordate at the base
 - * Bracts 12-18 mm. long; lateral lobes of lip shorter than the midlobe ... 24. *H. crassifolia*.
 - ** Bracts 6 mm. long; lateral lobes of lip longer than the midlobe ... 25. *H. diphylla*.

1. **Habenaria stenopetala** Lindl. Gen. & Sp. Orchid. (1835) 319 (nor 324); Hook. f. F.B.I. vi, 134; King & Pantl. in Ann. Roy. Bot. Gard. Calc. iii (1898) 308, t. 404; Cke. ii, 715 (excl. *Hab. modesta* Dalz.).

Cooke doubtfully gives as synonym: *Habenaria modesta* Dalz. in Kew Journ. Bot. ii (1850) 262, and cites in addition Dalz. & Gibs. 267. Dalzell's plant is quite a different species, very likely *Peristylus stenostachyus* Kränzl. The stem is leafy at the base and naked above. The bracts are half as long as the ovary, flowers greenish white, lip 3-fid, lateral divisions linear-lanceolate, free spreading, midlobe shorter ovate obtuse, cohering with the tips of the petals and upper sepal, and concealing the column, spur filiform, hardly clavate, a little longer than the ovary.

Description: Cke. ii, 715.—A very variable plant.

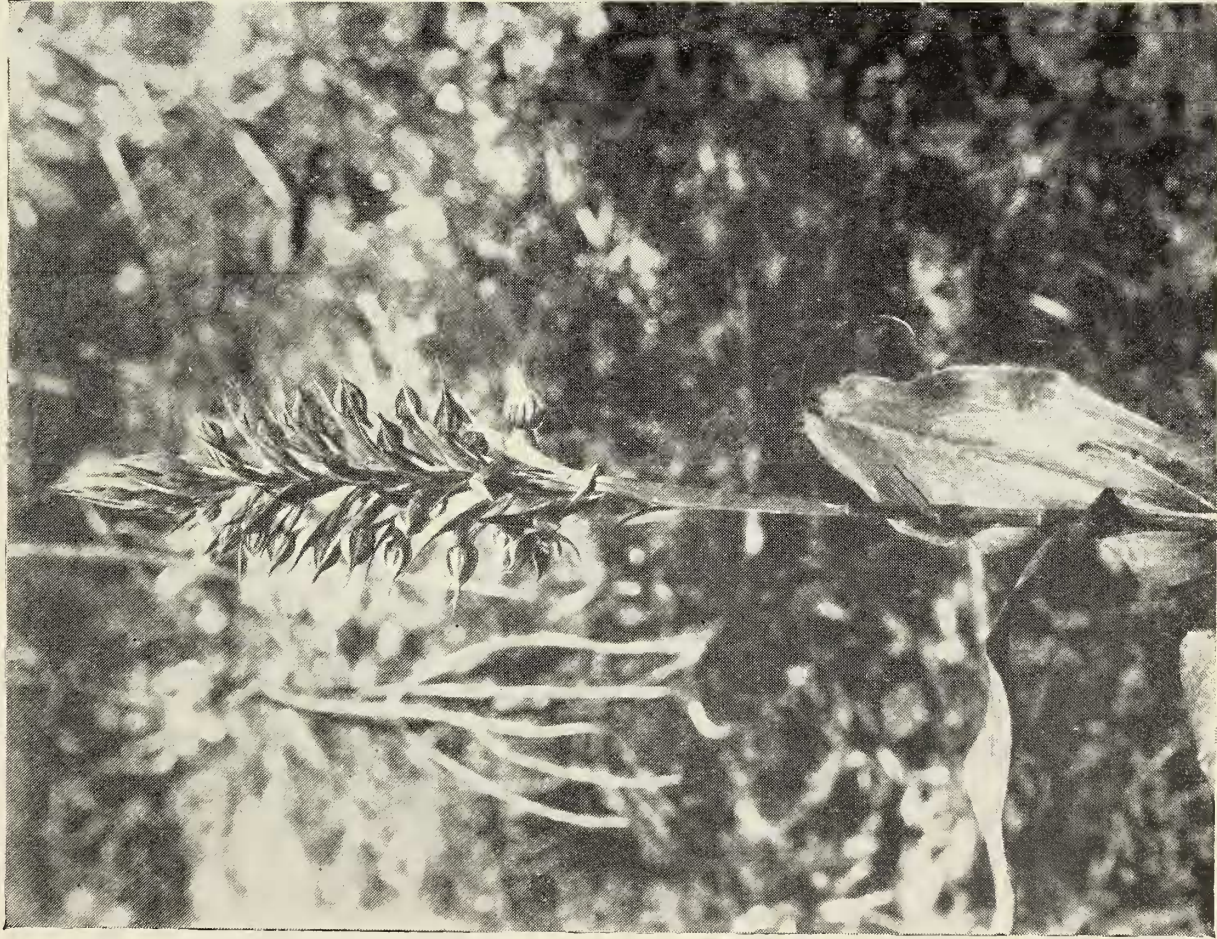
Locality: Konkan (Stocks).—W. Ghats: Parva Ghat (Dalzell 15); Londa (Spoonner !);—N. Kanara: Forests, without precise locality (Bell 5404 !).

Distribution: N.-W. India, Sikkim Himalaya, 3,000-6,000 ft. Upper Assam, Bengal, Bihar, Bombay Pres.

2. **Habenaria digitata** Lindl. Gen. & Sp. Orchid. (1835) 307; Hook. f. F.B.I. vi, 134 (partim); Kraenzl. Orch. Gen. & Sp. i (1897) 270; Cke. ii, 715 (partim).—*H. trinervia* Wight Ic. t. 1701.—*Bonatea benghalensis* Griff. in Calc. Journ. Nat. Hist. iv, 382.

Cooke has united *H. Gibsoni* Hook. f. with *H. digitata* Lindl. Cooke mentions in his description that the spur has an erect ligule at its mouth. In *H. Gibsoni* the ligule is absent. We treat *H. Gibsoni* as a distinct species.

Description: An erect ground orchid; tuber small, about 25 mm. diam., many fleshy roots from the stem above the tuber; stem tall, 30-60 cm. high, leafy. Leaves 5-12 cm. long, very variable, from ovate or orbicular to ovate-oblong or lanceolate and rarely narrowed into a short petiole, sessile on the sheath, papillose ciliate. Raceme or spike about 12 cm., rather laxly many-flowered with greenish or green and white flowers with a resemblance to



Habenaria stenopetala Lindl. a close-up of the inflorescence.



Habenaria stenopetala Lindl. entire plant.

Photos by C. McCann.

insects. Bracts large lanceolate, 20-25 mm., often almost foliaceous and exceeding the flowers; pedicels very short or almost absent. Flowers 12-18 mm. broad. Lateral sepals 8-9 mm. long, somewhat obliquely ovate, acute, without filiform tips, dorsal shorter, very concave. Petals bipartite nearly to the base with linear segments, upper broader, erect, recurved, about 6-8 mm. long, lower segment spreading and often recurved; lip tripartite with linear segments, midlobe straight, nearly 12 mm. long, lateral segments more filiform, often decurved, longer or usually shorter. Spur 16 mm. long, subclavate, sometimes inflated, with an erect ligule at the mouth. Anther-cells parallel, tubes short, upcurved; glands of pollinia minute. Stigmatic processes clavate; rostellum erect, triangular. Capsule shortly pedicelled, 12 mm. long, fusiform with thick ribs.—The flowers sometimes have a disgusting odour (Haines).

Locality: *Konkan*: Karanja Island (Dalzell & Gibson); Wada (Herb. Econ. Bot. Poona !); Matheran (Paranjpye !).—*W. Ghats*: Khandala (Hallberg !); Lonavla (Garade !); Purandhar (Burns); Mahableshwar (Sedgwick 7585 !, McCann 2898 !, 2899 !); Panchgani (McCann 2902 ! 3029 !, Blatter P80 ! 215 !).—*S. M. Country*: 20 miles W. of Dharwar, in shade of trees (Sedgwick 2636 bis !); near Nagargalli, Belgaum Dist., inside the margin of forest amongst other undergrowth, 2,800 ft. high, rainfall about 80-100 in. (Bell & Sedgwick 2944 !).—*N. Kanara*: Near Karwar (Talbot !); Yellapur (Talbot !).

Distribution: Kashmir, Assam, Sylhet, Bengal, Tenasserim, W. Ghats, hill tracts from the Godavari Dist. and Mysore to Tinnevely 2,000-6,000 ft.

Flowers: July 1917 (near Dharwar); Aug. (near Karwar); Sept. 1930 (Panchgani, Mahableshwar); Sept. 1917 (S. M. Country); Oct. 1882 (Yellapur); Oct. 1920 (Mahableshwar).

3. **Habenaria foliosa** A. Rich. in Ann. Sc. Nat. sér. 2, xv (1841) 71; Dalz. & Gibs. Bomb. Fl. 267; Wight Ic. t. 1700; Kraenzl. Orchid. Gen. & Sp. i. (1897) 273.—*H. digitata* Lindl. var. *foliosa* Hook. f. F.B.I. vi (1890) 135; Cke. ii, 716; Haines Bot. Bih. & Or. 1154; Fischer. in Fl. Madras. pt. viii (1928) 1469.

We follow Kraenzlin in restoring *H. digitata* var. *foliosa* to the rank of a species.—We are doubtful whether *H. laciniata* Dalzell in Kew Journ. Bot. ii (1850) 261 can be considered a synonym of *H. foliosa*. He mentions some characters which certainly do not fit in and which we have not observed in the Khandala specimens. It is more likely to be a distinct species, but as his specimen cannot be traced it will be difficult to decide the point. We have never found a plant in Salsette which answers completely Dalzell's description of *H. laciniata*.

Description: A terrestrial plant, 15-30 cm. high. Stem leafless at base, vaginate, sheaths loose. Leaves 5 by 2.5 cm., elliptic, acute, sheathing at base, imbricating, decreasing in size above. Racemes dense-flowered. Bracts ovate, acute, convolute at base, longer than the ovary. Flowers greenish or dirty white; sepals ovate; dorsal one broader and shorter than the lateral ones, 6 by 5 mm., lateral ones 8 by 3 mm., lanceolate. Petals, especially the extremities, green, deeply 2-cleft, upper segment 8 by 1.2 mm. long, lower lobe thinner and shorter. Lip 9 mm. long, tripartite to base, segments filiform, subulate, equal; spur 15 mm. long, inflated, length of ovary. Fleshy processes of column long, obtuse.

Locality: *Deccan*: On the hills about Kadakvasla near Poona (Cooke).—*W. Ghats*: Khandala, under a hedge (Sedgwick 2586 !); Mahableshwar (Talbot 4450 !).—*N. Kanara*: Karwar (Talbot 1902 !).

Distribution: Nilgiris, 4,000-7,000 ft. (Fischer), Manbhum (Haines).

Flowers: July 1917 (Khandala); Aug. 1889 (Karwar); Oct. 1905 (Mahableshwar).

4. **Habenaria Gibsoni** Hook. f. F.B.I. vi (1890) 135.—*H. digitata* Cke. ii, 715 (*partim*).—*H. digitata* Lindl. var. *Gibsoni* Fischer Fl. Madras pt. viii (1928) 1469.

We give first Hooker f.'s description:

A terrestrial plant; stem 20-30 cm. high, very stout, leafy; leaves 10-15 cm. long, linear-oblong; base sheathing. Racemes short, 6-8-flowered; bracts 25-38 mm. long, equalling or exceeding the ovary, membranous, broadly lanceolate, the lower exceeding the flowers. Flowers 25 mm. diam. Petals bipartite, segments narrow, subequal, upper segment broadest, fleshy; lip tripartite, segments linear-subulate, subequal, fleshy. Anther broad. Stigmatic

processes adnate to the back of the broad mouth of the spur, spur without a ligule; rostellum small, triangular, exposed.

So far Hook. f. We add some of our observations:

Tuber 1, egg-shaped, small. Stem up to 35 cm., lower third covered with sheaths, then 1-3 ovate or obovate acute or mucronate leaves, followed by lanceolate leaves which are longer upwards, the top leaf sometimes exceeding the inflorescence. Leaves very thin, darker grass-green on the upper, very pale on the lower side, lanceolate or linear—or oblong-lanceolate-mucronate or acuminate, up to 15 by 3.5 cm., many nerves distinctly visible on the upper side. Racemes lax, secund or subsecund, up to 8 cm. long, 4-7-flowered. Flowers white, base and nerves of dorsal sepal greenish; column and rostellum green, clavate tips of spur green. Not smelling.

The following points distinguish this species from *H. digitata* Lindl.: The plant is more robust, the leaves are longer and narrower, the raceme is much shorter and the flowers much larger and fewer, the bracts are larger and there is no ligule at the mouth of the spur.

Locality: Konkan: Hills W. of Molland, Salsette (McCann!).—*W. Ghats*: Khandala (McCann 25814 !, Blatter & Hallberg 25815 !, Blatter 25813! 25843!, Hallberg 26527!). Gibson mentions the same locality.

Distribution: Mysore (ex Fischer).

Flowers: July 1917 (Khandala); Aug. (Salsette).

Var. foetida Blatter & McCann, *var. nov.*

[*Planta valde foetens. Processus stigmatici adpressi ad labellum a latere faucium calcaris (non ad dorsum faucium). Ovarium tortuosulum. Lobus labelli centralis latior quam in typo.*]

Description: Dorsal sepal green; lateral sepal white, tinged with green. Upper lobe of petals green, lower green, white at base. Midlobe of lip broadest, all lobes green, white at base. Spur clavate, green, mouth without a ligule. Anther: Cells diverging below, separated from each other; connective green. Staminodes: 2 warty elongated greenish white processes. Rostellum shorter than anther, triangular, green, not united with or overlapping channel of anther-cells which open out just outside the lateral lobes of rostellum. Stigma: 2 oblong processes, white, appressed to the lip at the side of mouth of spur. Gland of pollinia exposed. Ovary twisted. Flower smelling badly.

Locality: Khandala, Monkey Hill (Hallberg! in Herb. St. X.C.)

Flowers: June 1917.

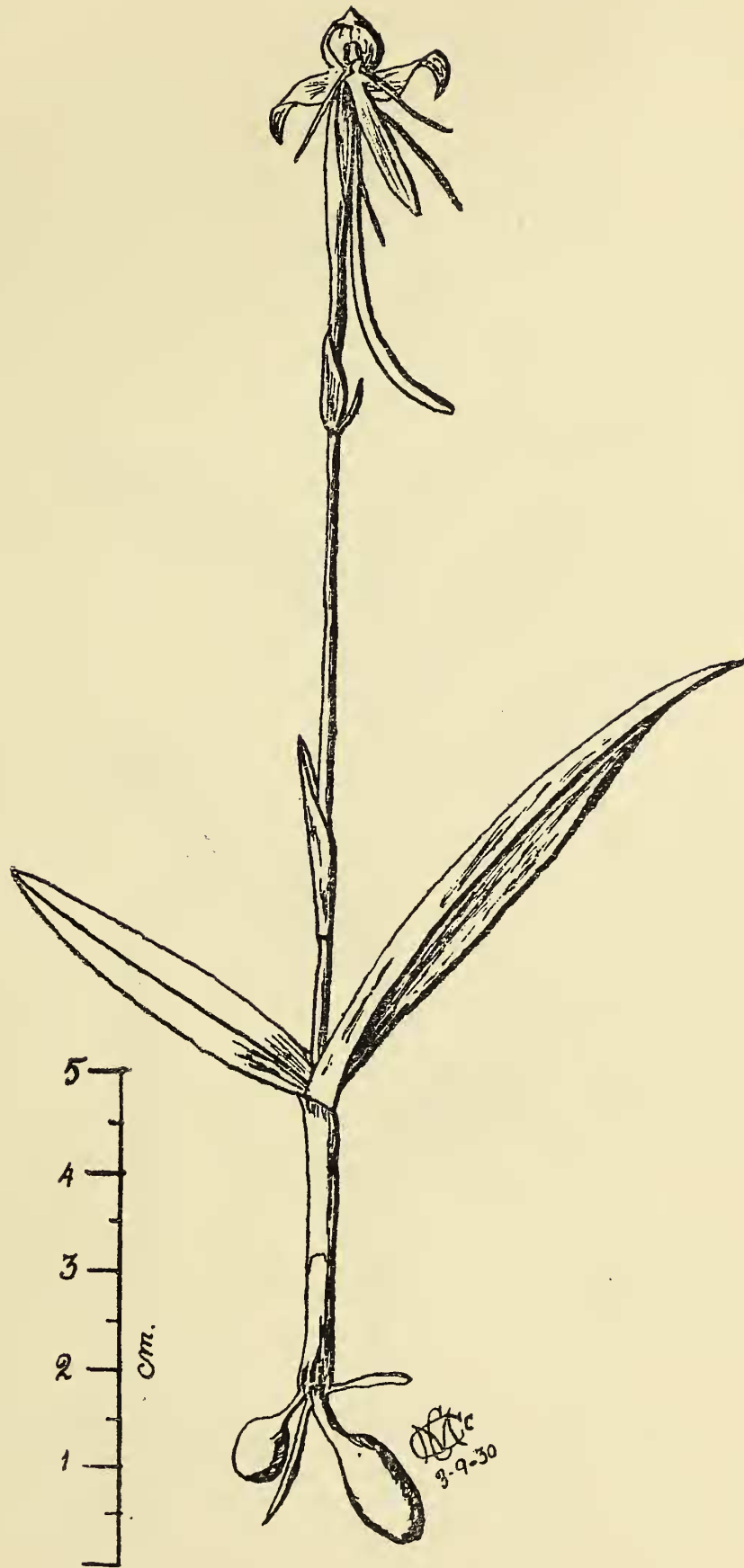
5. **Habenaria multicaudata** L. J. Sedgwick in Rec. Bot. Surv. India vi (1919) 352; Fischer Fl. Madras pt. viii (1928) 1469.

Description: An erect slender herb, up to 50 cm. high. Lower part of stem covered with obtuse appressed sheaths; the middle part leafy. Leaves elliptic-oblong, acute, many-nerved, trabeculate between the nerves, 6-15 cm. long, 2-4 cm. wide. Racemes up to 18 cm. long, many-flowered. Bracts 15 mm. long, shorter than the beaked ovary. Pedicel with the ovary up to 23 mm. long. Flowers white, spur brown and lip soon getting brownish. Dorsal sepal erect, cucullate, 6 by 4 mm., 3-nerved. Lateral sepals 8 by 5 mm., ovate, slightly falcate, acute, 3-nerved. Lateral petals bipartite, upper lobes erect, filiform, scarcely longer than the dorsal sepal, lower lobes up to 15 mm. long, filiform, fantastically contorted. Lip 3-partite, midlobe 10 mm. long, filiform, lateral lobes up to 25 mm. long, filiform, fantastically contorted. Spur 12 mm. long, curved, slender, slightly clavate at tip and sub-acute. Anther-cells very conspicuous and very large for the size of the flower; contiguous above, below broadly divaricate, tubes projecting. Pollinia very large, pyriform, caudicles scarcely longer; gland minute. Stigmatic processes elongate, appressed on both sides to the basal margins of the lip. Rostellum obscure.

Locality: N. Kanara: Guddehalli, a hill close to the sea-coast near Karwar, 1,500 ft., rainfall 150 in. (T. R. Bell 3045! type in Herb. Blatter); Karwar Hills, in thick jungle (T. R. Bell 7871 bis!); Katgal (Talbot!).

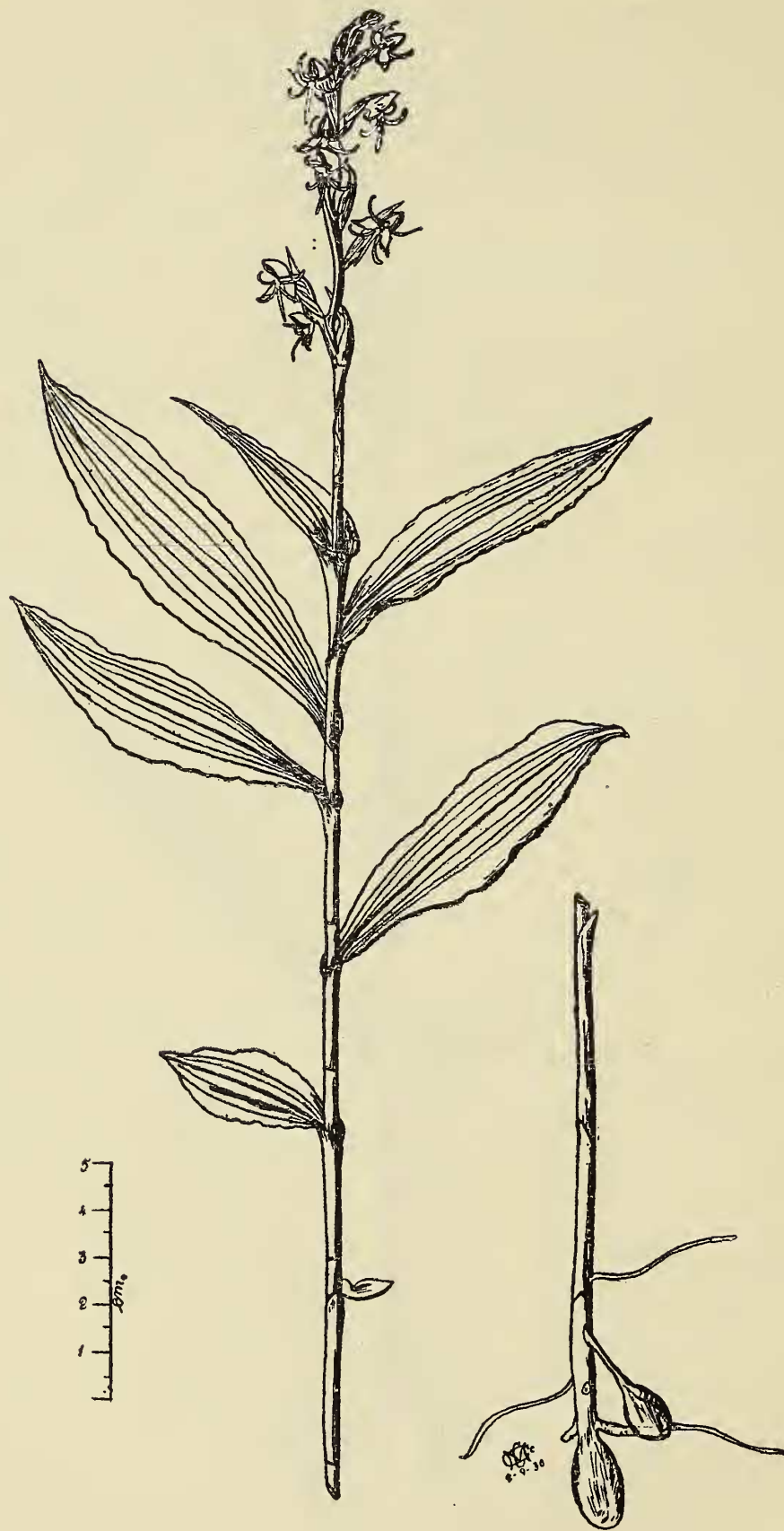
Distribution: N. Kanara, Nilgiri Hills, Anamalai Hills in Karianshola at 2,200 ft. (Fischer).

Flowers: Aug. 1883, 1920, Sept. 1917 (N. Kanara).



Habenaria rariflora A. Rich.

Del. C. McCann.



Habenaria Spencei Blatter & McCann, sp. nov.

6. **Habenaria Spencei**¹ *sp. nov.* Blatter & McCann.

[*Pertinens at sectionem Ate similis est Habenariae digitatae Lindl. a qua tamen differt omnibus florum partibus multo minoribus, lobis petalorum superioribus non intra sepala lateralialia positis sed porrectis abscuntibus ultra sepala lateralialia, lobis petalorum inferioribus quam superiores longioribus, sepalis lateralibus anguste ovato-lanceolatis acuminatis, sepalo dorsali ovato-acuminato cucullato 3-nervoso apice subobtusio, calcar paulo ovario brevior fusiformi dorsi-ventraliter applanato.*].

Description: Tubers undivided, elliptic, up to 3.4 cm. long; roots arising from the base of the stem, forming tubers. Stem about 45 cm. high, leafy in the upper half, with closely appressed sheaths in the lower. Leaves oblong-lanceolate, acuminate, membranous, pale green, sheathing at base, margin wavy, midrib depressed above, 3 less distinct parallel nerves on each side. Flowers pale yellow-green. Racemes lax, about 8-11-flowered, flowers on one side. Bracts usually shorter than the flowers, about 2 cm. long, ovate-lanceolate, acuminate. Pedicels hardly 1 mm. long. Dorsal sepal ovate-acuminate, cucullate, subobtusio at the apex, 7.5 mm. long, 3-nerved; lateral sepals up to 8.5 by 3.5 mm., narrowly ovate-lanceolate-acuminate, subfalcate, spreading. Petals 2-partite; upper segment as long as the dorsal sepal, subfalcate, linear, acute; lower segment narrower, filiform, slightly longer than the upper, spreading, recurved. Lip 3-partite, segments linear, acute, the middle one slightly longer than the lateral, 9 mm. long, lateral segments recurved, margin of midlobe reflexed. Spur slightly shorter than the ovary, 10.5 by 3 mm., spindle-shaped, flat dorsiventrally, lower portion whitish, rest greenish, with a ligule at the mouth. Stigmatic processes subclavate, not appressed to the lip. Anther-cells parallel, tubers upcurved, rostellum shorter than the anther, triangular, apiculate. Fruit not seen.

Locality: *W. Ghats:* Mahableshwar, Fitzgerald Ghat, in dense jungle, 4,000 ft. (McCann 3026! type, 3027! cotype).

Flowered: 28th. August 1930.

7. **Habenaria rariflora** A. Rich. in *Ann. Sc. Nat. sér. 2, xv (1841) 70, t. 2, D; Dalz. & Gibs. Bomb. Fl. 268; Wight Ic. t. 924; Kraenzl. Orchid. Gen. & Sp. i (1897) 271; Cke. ii, 716; Fischer Fl. Madras. pt. viii (1928) 1469.—H. uniflora Dalz. in Kew Journ. Bot. iii (1851) 344.*

Description: Cke. ii, 716.—Lip up to 15 mm. long; lateral segments of lip longer than or as long as, the midlobe; the lateral segments have a tooth-like lobe on the outer side near the apex.

Locality: *Konkan (Stocks).—Deccan:* Karkula, near Poona (Woodrow).—*W. Ghats:* Khandala (Hallberg 26497!, Blatter 25842!); Purandhar (Barnes, Bhide!); Panchgani (Cooke!, Blatter 211!, Frenchman 212!, Sedgwick 7911 bis!); Pasarni Ghat (McCann!).

Flowers: July 1917 (Khandala); July 1925 (Panchgani); Aug. 1919 (Khandala); Aug. 1921 (Panchgani); Sept. 1930 (Pasarni Ghat.).

Distribution: Konkan, Deccan, *W. Ghats* of Bombay and Madras Pres., 2,000-6,000 ft., Horsleykonda at 4,100 ft., Kollimalai Hills.

Var. latifolia *var. nov.* Blatter & McCann.

[*Folia ovato-acuta vel ovato-acuminata, ad 5 cm. longa et 2-3 cm. lata. Calcar quam in typo brevior.*]

Locality: Panchgani, 3rd. milestone towards Wai (Frenchman 213!).

Flowers: July 1925.

Note: It is not impossible that this variety is a hybrid between *Habenaria rariflora* A. Rich. and *H. grandiflora* Lindl.

8. **Habenaria grandifloriformis** *sp. nov.* Blatter & McCann.

[*Orchidacea similis Habenariae grandiflorae Lindl. a qua tamen differt folio secundo valde variabili nunc simili primo, tunc oblongo-lanceolato et fere acuminato, petiolo vaginanti 1 cm. longo, racemis 1-7 floris, bracteis multo longioribus et ovaris aequilongis ovato-oblongis acutis, pedicellis quam ovaria duplo longioribus, sepalis lateralibus multo largioribus 5-nervis, petalorum segmentis inferioribus longissimis, labio 22 mm. attingenti, labii lobis lateralibus medio multo longioribus, calcar usque ad 4 cm. longo.*]

Description: Terrestrial. Tuber irregular, undivided, usually flattened on one

¹ After Sir Reginald Spence, for many years Hon. Secretary of the Bombay Natural History Society.

side, sometimes round, roots arising above the tuber, fleshy, brittle, numerous. Whole plant 7-22 cm. high, very slender. Leaves 1 or 2. Lower leaf broadly ovate, acute or orbicular-acute, apiculate, sometimes broader than long, base cordate amplexicaul, basal lobes rounded, up to 8 cm. long, 7 cm. broad, second leaf varying a good deal, shape as of first leaf, but generally narrower, sometimes oblong-lanceolate, almost acuminate, apiculate, basal lobes smaller, petiole sheathing about 1 cm. long. Flowers white, faint-scented, in lax 1-7-flowered racemes; scape ribbed and striate, with one sheath; bracts: lowest 2.2 cm. long, 1.3 broad, ovate-oblong, acute, green, getting smaller upwards, topmost subscarious. Pedicels up to 5 cm. long, much longer than the ovary, ribbed, ribs continuous with those of ovary. Lateral sepals 1.5 cm. long by 6 mm., broadly ovate-triangular, very oblique, almost acute, 5-nerved, nerves only in fading flowers distinctly visible; dorsal sepal 9 mm. long, 6 mm. broad, ovate, obtuse, apiculate, 5-nerved, cucullate. Petals 2-partite; upper segment 8 mm. long, 5 mm. broad, in shape resembling the lateral sepals, but shorter or almost semi-ovate-orbicular, lower segment 17 mm. long, filiform. Lip 22 mm. long, 3-partite, segments spreading, lateral segments filiform- to oval-shaped, about 5 mm. longer than the middle one; midlobe linear-lanceolate, or linear-oblongate, blunt at apex or slightly apiculate, 2 mm. broad. Spur up to 4 cm. long, curved, whitish above, lower part green, flattened, club-shaped at tip, with a groove on each flattened side. Anther 3-cuspidate, the middle one longest; cells parallel, tubes longer than broad, slightly diverging; gland of pollina large, orbicular, milky. Stigmatic processes large, club-shaped, white-waxy. Rostellum 3-lobed, the midlobe narrowly linear-apiculate, erect, hidden between the anther-cells, but longer than the cells, the side lobes very short, thicker than the midlobe, lying parallel with the stigmatic lobes. Ovary elongate-oblong, 6-lobed, slightly curved, 17-22 mm. long, green. Capsule having the shape of the ovary, curved, 2.8 cm. long, 0.5 cm. wide, truncate at top.

Called 'Snowdrop' locally at Panchgani.

Locality: *W. Ghats*: Panchgani, in grassland on Tableland (Blatter P. 20 ! type, P. 22 ! P. 23; cotypes. Sedgwick 7900 !); Khandala, in grassland, abundant (Blatter 25835 !, Hallberg 26501 !).—*Deccan*: Satara (Hallberg !).—*S. M. Country*: Dharwar, grassy hills, abundant (Sedgwick 2601 !).

The most common orchid at Panchgani, growing in almost any locality: in grass, in fields, along roads, and in rocky places.

Flowers: June and July 1925 (Panchgani); July 1917 (Dharwar, Khandala); Aug. 1916 (Khandala); Nov. 1921 (Panchgani).

Fruit: Aug. 1916 (Khandala).

The flowers appear after the first monsoon showers and new flowers have been noticed at Panchgani from the end of May to November.

Var. *aequiloba* var. nov. Blatter & McCann.

[*Labii lobi laterales lobo medio aequilongi vel eo breviores, surgentes 4 mm. supra labii basim.*]

Locality: Panchgani (Blatter P. 20a, type).

Flowers: Middle of July 1925.

9. ***Habenaria grandiflora*** Lindl. in Wall. Cat. (1828) 7032; Dalz. & Gibs. Bomb. Fl. 267; Hook. f. F.B.I. vi, 136; Kraenzl. Orchid. Gen. & Sp. i (1897) 337; Cke. ii, 716; Fischer Fl. Madras pt. viii (1928) 1469.—*H. rotundifolia* Lindl. Gen. & Sp. Orchid. (1835) 306.

Description: Cke. ii, 716.

Locality: *Konkan*: (Stocks, Law).—*Deccan*: Maval, Poona Dist. (Stocks); Shivapur (Cooke !); Sinhagad, near Poona (Woodrow !, Bhide !); Purandhar (Woodrow !).—*W. Ghats*: Mahableshwar (Cooke !); Khandala (Sedgwick 2627 !).—*S. M. Country*: Belgaum (Stocks, Talbot 2436 !).

Distribution: Konkan, Deccan, W. Ghats, Bababudan and Shevaroy Hills.

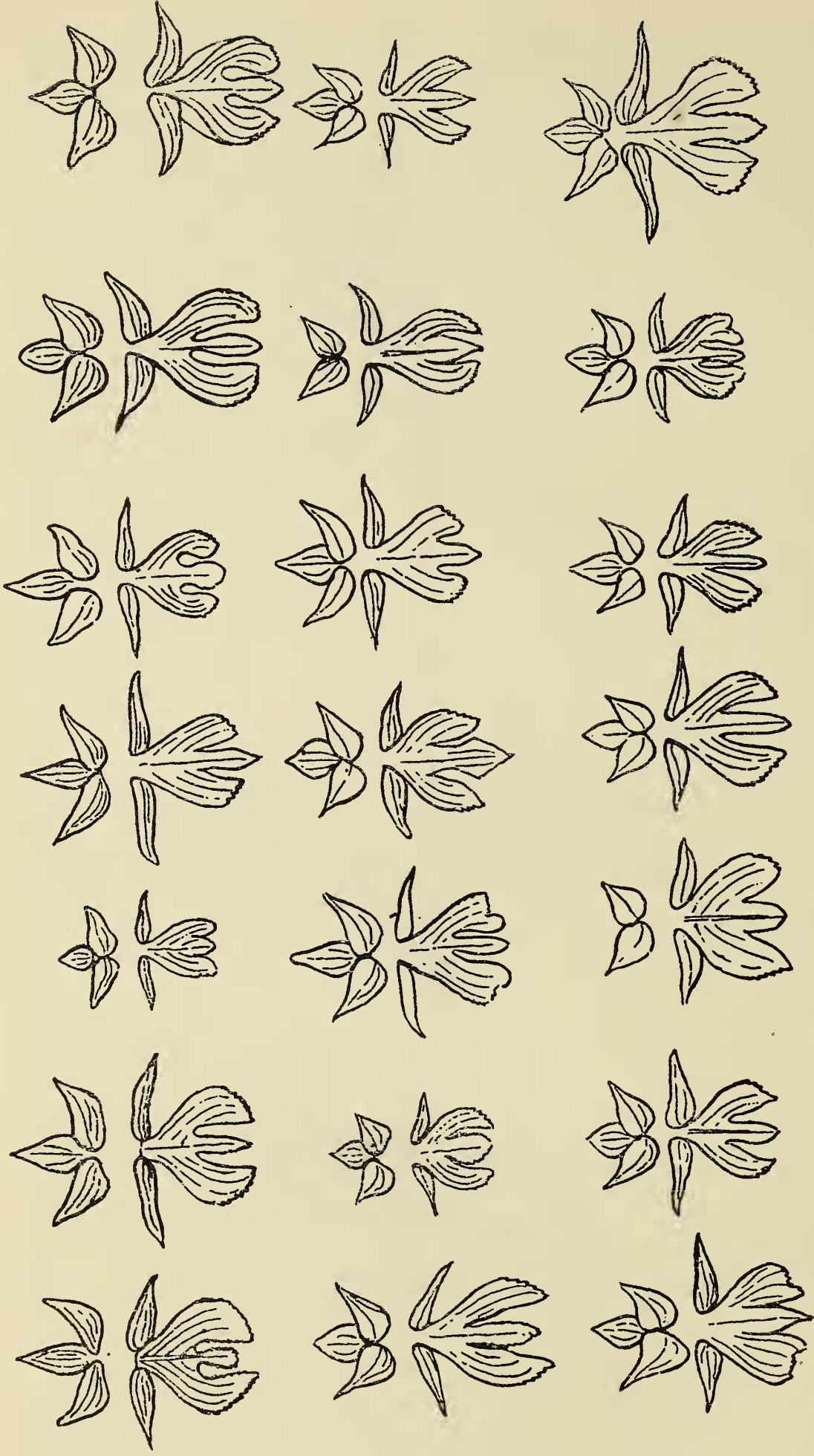
10. ***Habenaria platyphylla*** Spreng. Syst. Veg. iii (1826) 690; Grah. Cat. 201; Wight Ic. t. 1709; Hook. f. F.B.I. vi, 140; Kraenzl. Orchid. Gen. & Sp. i (1897) 411; Cke. ii, 717; Haines Bot. Bih. & Or. 1155; Fischer Fl. Madras pt. viii (1928) 1470.—*Orchis plantaginea* Roxb. Corom. Pl. t. 37.

Description: Cke. ii, 717.—We have never seen a specimen of this species. There seems to be a difference of opinion with regard to the number and size of the leaves. Hooker mentions 3-6, which are 3-5 in. long, Cooke has the same number, but 2-4 in. long, Fischer has observed the same number of



Del. C. McCann.

Habenaria variabilis Blatter & McCann, *sp. nov.*



Habenaria variabilis Blatter & McCann, sp. nov. showing the extreme variation in the formation of the floral parts.

Del. C. McCann.

leaves, but 1.5-5 in. in length. These discrepancies can be reconciled with each other. Haines, however, differs entirely. 'Leaves,' he says, 'always 2 wherever I have seen it (ranging from Chota Nagpur to Chanda in the Central Provinces)'. The length of his leaves is 1.5-3 in.

Locality: Konkan, Belgaum, Dharwar.

Distribution: Chota Nagpur, Central Provinces, Konkan, S. M. Country, in all districts of Madras Pres. near sea-level up to 3,500 ft.

11. **Habenaria suaveolens** Dalz. in Kew Journ. Bot. ii (1850) 263; Dalz. & Gibs. Bomb. Fl. 268; Hook. f. F.B.I. vi, 140; Kraenzl. Orchid. Gen. & Sp. i (1897) 416; Cke. ii, 717; Fischer Fl. Madras pt. viii (1928) 1470.

Locality: Konkan (Dalzell); between Vengurla and Malvan, rare (Dalzell & Gibson.)

Distribution: Konkan, Bababudan Hills.

12. **Habenaria variabilis** *sp. nov.* Blatter & McCann.

[*Persimilis Habenariae suaveolenti* Dalz. *sed. differt foliis minoribus nunquam linearibus vel lineari-oblongis, floribus multo largioribus in racemis densis usque ad 11-floris, labio sepalo dorsali duplo longiore, labii lobo medio 5 mm. lato, calcare ovario multo brevior, polliniis oblongis aliquomodo obliquis minime clavatis, caudiculis tenuissimis, glandibus disciformi-oblongis profunde concavis.*]

Description: Tuber egg-shaped, undivided; roots many, stout, fleshy, brittle, arising from above the tuber. Stem up to 12-22 cm. high, clothed at the base below the leaves with a few sheaths. Leaves 3-5, arising about 3 cm. above ground, 4-8 cm. long, 1-2.5 cm. broad, sheathing, lanceolate or oblong-lanceolate, subacuminate or acuminate, 5-nerved, followed higher up by 1 or 2 bract-like oblong- or ovate-lanceolate acuminate leaves. Flowers large, white, fragrant, in few- to many-flowered (usually 3-4, but also 2-11) secund or subsecund dense racemes (base of upper flower touching the tip of lower); bracts 2 by 1 cm., ovate-acuminate, getting smaller upwards, shorter than the pedicelled ovary, very rarely exceeding it; inflorescence 4-12 cm. long. Lateral sepals 14 by 6 mm., elongate-triangular, falcate, acute; dorsal 11 by 6 mm., broadly ovate-acute, cucullate. Petals 12 by 7 mm., obliquely ovate-acute, almost covered by dorsal sepal. Lip 22 by 24 mm., divided into 3 lobes to half way down more or less; side lobes up to 9 mm. broad, obliquely truncate, the truncate part finely crenulate; midlobe slightly longer than the side lobes, 5 mm. broad, broadly or narrowly lanceolate, sub-acute. Spur 11 mm. long; straight or very slightly bent near base, much shorter than the ovary, subclavate at apex, white near base turning greenish towards apex. Gynostemium 4-5 mm. Anther-cells parallel, apex acute, a central longitudinal groove on back; anther-tubes 0; pollinia 2.5 mm. long, oblong, slightly oblique, yellow, granular; caudicles slender, white, transparent, as long or shorter than the pollinia; pollen yellow, oblong, obliquely truncate at both ends, slightly flattened. Glands exposed, disk-shaped-oblong, deeply concave above, white-transparent. Stigmatic processes very short, greenish yellow. Rostellum triangular. Ovary 17 mm. long, sessile or subsessile, elongate, 6-ribbed. Fruit sessile or subsessile, 2.5 cm. long, 7 mm. diam., spindle-shaped, with 6 strong ridges, green.

Locality: W. Ghats: 3rd. milestone from Panchgani to Wai (Frenchman P. 21 ! type); Panchgani on Tableland, in grass (Hallberg 26494 !, Blatter P. 55 ! 200 ! 201 ! 202 ! 203 ! 204 !, Sedgwick 7908 bis !); Mahableshwar, on rocky ground near lake (Mozelle Isaacs and Blatter 205 ! 206 !, McCann !). Very common at Panchgani.

Flowers: July 1925 (Panchgani, Mahableshwar); Aug. 1925 (Panchgani)

The flowers are all turned eastwards on the Tableland of Panchgani owing in all probability to the strong west wind.

Note: Our first impression was that this plant was identical with *Habenaria suaveolens* Dalz. Only when we had seen Dalzell's specimen collected in the Konkan (Herb. Calcutta) it became evident that our specimens belonged to a different species, though approaching *H. suaveolens* with regard to many points.

The new species is very variable, at least regarding size and shape of lip: The illustration shows a number of variations which could easily be multiplied.

We are inclined to think that our species is a hybrid between *H. suaveolens* and another species not known to us. It is also possible that the new species is in a state of evolution, perhaps derived from *H. suaveolens*.

It is surprising that this plant should not have been noticed before. But

the same fate has attended many other ground orchids and other Monocotyledons. The explanation why they have been overlooked is very likely to be found in the fact that the W. Ghats are not usually visited during the rains.

13. **Habenaria longicalcarata** A. Rich. in Ann. Sc. Nat. sér. 2, xv (1841) 71, t. 3, B; Dalz. & Gibs. Bomb. Fl. 268; Wight Ic. t. 925; Hook. f. F.B.I. vi, 141; Kraenzl. Orchid. Gen. & Sp. i (1897) 418; Cke. ii, 718; Haines Bot. Bih. & Or. 1156; Fischer Fl. Madras pt. viii (1928) 1470.—*H. longicorniculata* Grah. Cat. Bomb. Pl. (1839) 202.

How to distinguish this species from *H. decipiens* Wight and *H. longicornu* Lindl. see Fischer in Journ. Ind. Bot. Soc. vi (1927) 113.

Description: Cke. ii, 718.

Locality: Konkan (Jacquemont 598); Ambenali (McCann !); Konkan Ghats (Stocks 22); Khandala to Kampoli (Garade !).—*Deccan*: Purandhar (Kanitkar !); Katraj Ghat (Blatter & Hallberg 26526 !, Garade !, Shevde !).—*W. Ghats*: Khandala (Chibber 90 !, Gammie 15467 !); Lonavla (Herb. Econ. Bot. Poona !); Bhor Ghat (Cooke !); Castle Rock (T. R. Bell 4370 !).—*S. M. Country*: Near Belgaum, abundant (Dalzell & Gibson); Londa (Spooner !); W. of Dharwar (Sedgwick).—*N. Kanara*: Yellapur (Talbot !, Herb. Calc.); Siddhapur, grassland (Sedgwick 7010 !).

Distribution: Konkan, Deccan, W. Ghats, S. M. Country, N. Kanara, throughout the W. Ghats of the Madras Pres., Bellary Dist., Bihar and Orissa.

Flower: July 1882 (Yellapur); Aug. (Katraj Ghat); Sept. 1918 (Castle Rock).

Fruit: Oct. 1919 (Siddhapur).

Var. viridis var. nov. Blatter & McCann.

[*Planta 90 cm. alta. Folia adnumeratis foliis superioribus bracteisformibus*
20. *Racemus 6-florus. Sepalum dorsale, rostellum necnon anthera pallide viridia. Sepalum dorsale album viridi-subfusum. Petala viridia. Processus stigmatici et staminodia minuta atro-viridia. Rostellum distinctum.*]

Locality: W. Ghats: Khandala (Hallberg !, Herb. St. X. C.).

14. **Habenaria plantaginea** Lindl. Gen. & Sp. Orchid. (1835) 323; Wight Ic. t. 1710; Hook. f. F.B.I. vi, 141; Trim. Fl. Ceyl. iv, 229; Kraenzl. Orchid. Gen. & Sp. i (1897) 413; Prain Beng. Pl. 1030; Duthie in Ann. Roy. Bot. Gard. Calc. ix, pt. 2, 181, t. 132; Cke. ii, 718; Haines Bot. Bih. & Or. 1155; Fischer Fl. Madras pt. viii (1928) 1470.—*Orchys platyphyllos* Roxb. Fl. Ind. iii (1832) 609.

Description: Cke. ii, 718.

Locality: Konkan: (Dalzell); Matheran (Birdwood); Ambenali, below Mahableshwar (McCann & Blatter !).—*W. Ghats*: Ambenali Ghat near Lonavla (Kanitkar); Mahableshwar, forests (Sedgwick 4555 !, Sedgwick's collector 7591 bis !).—*N. Kanara*: Siddulgundi (Talbot 701 !); Guddehalli, above Karwar (Bell !); Katgal, evergreen (Sedgwick 6865 !).

Distribution: Outer Himalayan ranges of Garhwal and Kumaon up to 7,000 ft., Sikkim, Bengal, Bihar, Central India, Konkan, W. Ghats, Deccan, N. Kanara, in all districts of the Madras Pres., 800-4,000 ft.

Flowers: Oct. 1930 (Ambenali); Oct. 1920 (Mahableshwar); Nov. 1918 (Mahableshwar); Nov. (N. Kanara).

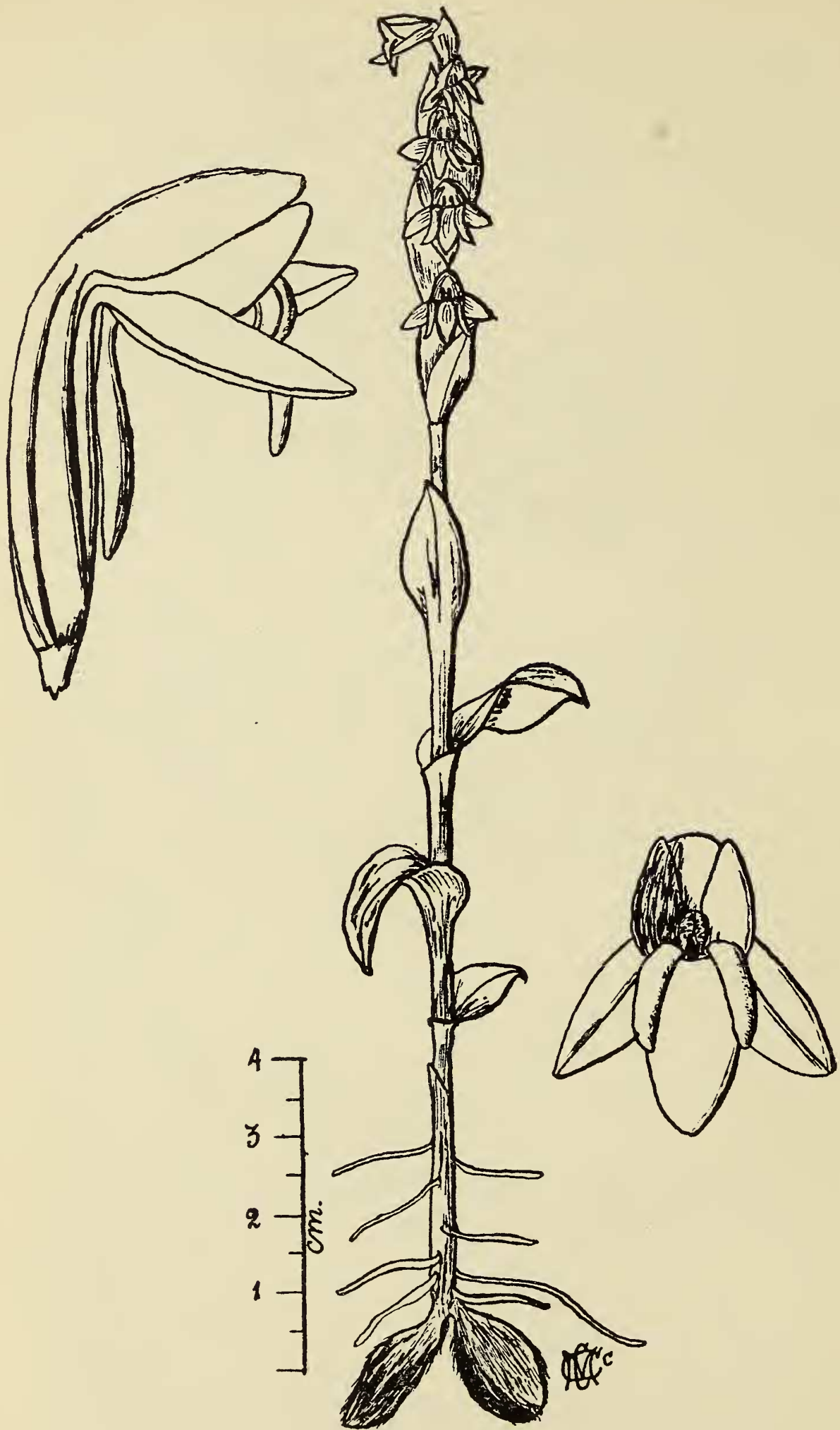
15. **Habenaria crinifera** Lindl. Gen. & Sp. Orchid. (1835) 323; Dalz. & Gibs. Bomb. Fl. 269; Wight Ic. t. 926; Trim. Fl. Ceyl. iv, 229; Hook. f. F.B.I. vi, 142; Kraenzl. Orchid. Gen. & Sp. i (1897) 424; Cke. ii, 718; Fischer Fl. Madras pt. viii (1928) 1471.—*H. schizochilus* Grah. Cat. Bomb. Pl. (1839) 252.

Description: Cke. ii, 718.

Locality: Konkan: Vengurla (Dalzell & Gibson).—*S. M. Country*: Ramghat (Dalzell ex Stocks 5).

Distribution: Konkan, S. M. Country, W. Ghats of Madras Pres. below 4,000 ft.

16. **Habenaria commelinifolia** Wall. ex Lindl. Gen. & Sp. Orchid. (1835) 325; Kraenzl. Orchid. Gen. & Sp. i (1897) 322; Hook. f. F.B.I. vi, 143; Prain Bengal Pl. 1031; Cke. ii, 719; Duthie in Ann. Roy. Bot. Gard. Calc. ix, pt. 2, 183, t. 134; Haines Bot. Bih. & Or. 1157; Fischer Fl. Madras pt. viii



Del. C. McCann.

Habenaria cerea Blatter & McCann, sp. nov.

(1928) 1470.—*Orchis commelinifolia* Roxb. Fl. Ind. iii (1832) 451; Grah. Cat. Bomb. Pl. 201.

Description: Cke. ii, 719.—We add the following details: Tubers large, ellipsoid or cylindrical. Leaves acute or often subspinescent at the apex, margins pale. Bracts scaberulous on both surfaces, ciliolate on the margins. Sepals scaberulous, dorsal greenish with white margins; lateral sepals spreading, with many veins deeply looped or arched. Midlobe of lip linear, channelled above, curved, tapering, with a knee about 1 mm. from the tip, scaberulous. Spur slender, curved downwards, its upper portion funnel-shaped and white, the apex clavate, green. Anther-cells elongate, distant, diverging at the base; tubes long, straight, fused with the arms of the rostellum along their whole length. Pollinia small, oval, yellow, caudicles very long, 10 mm., very elastic, filiform, broader above, translucent; glands minute, orbicular. Staminodes white, seated on the long arms of the white column and curving round in front of the anther-tubes.

According to Cooke the dorsal sepal measures 10 mm. and the lateral ones 12 mm. Duthie says that the lateral sepals are much shorter than the dorsal one. In Hallberg's specimen from Salsette the dorsal sepal measures 6 mm. only.

Locality: *Konkan*: (Dalzell); Salsette (Hallberg !); S. of Tulsi lake in grassland (McCann !); Bassein (Ryan 1341 !); S. Konkan in pasture lands (Graham).—*Deccan*: Purandhar (Bhide !).—*W. Ghats*: Khandala (Woodrow).—*N. Kanara*: Yellapur, in forests, 2,000 ft. (T. R. Bell 3101 ter !); in evergreen and deciduous forest (Talbot 702 !).

Distribution: Outer ranges of W. Himalaya, from the Punjab to Kumaon, up to 5,000 ft., extending eastwards to Parasnath, Chota Nagpur, Bihar and Upper Burma, Central India, Konkan, W. Ghats, Deccan, N. Kanara, Bababudan Hills.

Flowers: Oct. 1919 (Yellapur).

17. ***Habenaria cerea* sp. nov.** Blatter & McCann.

[*Sect. Trimeroglossa. Accedit ad H. Heyneanum* Lindl. *sed facile distinguitur foliis distichis vel subdistichis minime subimbricatis, bracteis quam flores multo brevioribus, sepalis inaequalibus, floribus multo maioribus generatim albis, calcare medio aliquantulum incrassato non subclavato apice medium ovarium attingente, glandula triangulari non orbiculari.*]

Description: A terrestrial plant. Tubers 1 or 2, globose or oblong, strong fleshy fibrous roots arising above the tuber and for about 2.5 cm. above it on the stem. Stem up to 25 cm. high, stout, straight, rigid, leafy. Leaves alternate, distichous or subdistichous oblong or ovate or ovate-oblong, acute or acuminate, apiculate, leathery, rigid, 4.5 cm. by 15-18 mm., main nerve deeply depressed above, prominent beneath, the lower leaves smaller, the upper passing into bracts, sheathing at base. Flowers generally white, sometimes greenish yellow, sometimes both on the same plant, fleshy, wax-like, rigid, secund, growing at a right angle to the stem, shortly pedicellate, pedicel 1-2 mm. long, in dense racemes 4-6 cm. long, flowers touching each other. Bracts imbricating, broadly ovate, cucullate, 3-5-nerved, acute or acuminate, getting smaller upward, much shorter than the flowers, margin scarious, (devoid of chlorophyll). Pedicels with ovary up to 17 mm. long. Lateral sepals up to 10 mm. long, 4 mm. broad, oblong, falcate (i.e. straight on the upper, rounded on the lower edge), spreading; dorsal sepal ovate-oblong, rounded at tip. Petals up to 9 mm. long, 3 mm. broad, falcate, acute. Lip up to 10 by 6 mm. long, claw 1 mm. long and broad, a little above the claw the lip divided into 3 parallel lobes; midlobe 7 by 2-3 mm., oblong, blunt; side lobes linear, 5 by 1-1.5 mm. blunt, not in the same plane as the midlobe, but slightly raised, all bent down. Spur 7-8 mm. long, green, straight, appressed to the ovary, uniformly thick except for a very slight thickening in the middle, only half as long as the ovary. Caudicles very slender, transparent, as long as the diameter of the large spherical yellow pollinia; gland flat, triangular, white. Pollen grains mostly triangular. Stigmatic processes large, spreading, in the lower part adnate to the claw of the lip; no anther-tubes. Fruit spindle-shaped, about 12 mm. long, 4 mm. diam., strongly 6-ribbed; pedicel 4 mm. long, adnate to the axis.

A very distinct species, not variable at all except regarding the size of the different parts of the flower in young and adult flowers and in plants

growing in different localities. The stem is usually stout and rigid, but sometimes in shady places slender, with fewer leaves more distant from each other.

This species approaches *Habenaria Heyneana*. It differs, however, in the following details: Flowers generally white, leaves differently shaped and distichous, or subdistichous, bracts much shorter than the flower, shape of lateral and dorsal sepals different. Flowers larger, spur not subclavate at tip, but with a slight thickening about the middle, gland flat triangular, not orbicular.

Locality: *W. Ghats*: Panchgani, Tableland, 4,400 ft., rainfall 60 in., in grassland (Blatter P. 73 ! type, P. 74 ! P. 75 ! P. 76 ! cotypes, Sedgwick 7907 bis. ! 7568 !): Mahabaleshwar, near Lake (McCann !).

Very common on the First Tableland of Panchgani, in grassland, visible from a great distance in the very short grass. We have found it in flower during Aug., Sept. and beginning of Oct.

Locally the plant is called 'Tooth-Brush'; the name is not very poetical but expressive.

Var. polyantha var. nov. Blatter & McCann.

[*Multo maior quoad omnes partes vegetativas atque sexuales. Flores in 3-5 seriebus longitudinalibus parallelis dispositi et valde numerosi (usque ad 40).*]

We found this plant on the 25th. Aug. 1926 in grassland on the Third Tableland of Panchgani. The ground was simply covered with it, all the flowers turned eastwards. (Blatter 255 ! type.)

We have long doubted whether we should make this plant a new species or a variety of *H. cerea*. We cannot find the slightest difference between the flowers of the new variety and *H. cerea*, except for the fact that the flowers of the new variety are almost twice the size; but the proportions of the different flower parts are exactly the same in both. Flowers with cream coloured petals and lip are perhaps more numerous in the variety than in the type.

Otherwise the plant looks quite different from *H. cerea*. It grows up to a height of 45 cm. The inflorescence reaches 15 cm. and is up to 4 cm. broad. The flowers are arranged in 3-5 longitudinal parallel rows. The flowers of the inner rows look all one way, but those of the external rows stand almost at a right angle to the others, not being able to overcome the resistance of the coriaceous bracts.

It is strange that the type should grow on the First Tableland, not mixed with any specimens of the variety, whilst the variety is found on the Third Tableland. The two Tablelands are divided from each other by a shallow valley not more than a 150 ft. deep. The soil and rain conditions as well as exposure are the same on both Tablelands.

18. **Habenaria Heyneana** Lindl. Gen. & Sp. Orchid. (1835) 320; Dalz. & Gibs. Bomb. Fl. 268; Wight Ic. t. 923; Hook. f. F.B.I. vi, 148; Kraenzl. Orchid. Gen. & Sp. i (1897) 375; Cke. ii, 719; Fischer Fl. Madras pt. viii (1928) 1471.—*Platanthera Heyneana* Lindl. in Wall. Cat. 7044.—*Habenaria glabra* A Rich. in Ann. Sc. Nat. sér. 2, xv, 75, t. 5, A.—*H. subpubens* A Rich. Ic. t. 4, c; Kraenzl. Orchid. Gen. & Sp. i (1897) 361; Hook. f. F.B.I. vi, 148; Cke. ii, 720.—*H. candida* Dalz. in Kew. Journ. Bot. ii (1850) 262; Dalz. & Gibs. 267.

We had united *H. subpubens* A. Rich. with *H. Heyneana* Lindl. some six years ago, but we did not feel confident to publish the reduction, because we had not seen the material which had induced Hook. f. and Cooke to keep the two species distinct. It is true Hook. f. had already remarked in his Fl. Brit. Ind. (vi, 149) when describing *H. subpubens*: 'Very near *H. Heyneana*, and perhaps only a form of it, but more slender, leaves scattered linear 2-2½ in., bases narrowed, bracts narrower, flowers white, lip very different, spur more slender, anther apiculate, glands of the pollinia approximate and even cohering oblong with recurved sides, stigmatic processes longer, adnate to the claw of the lip.'

Wight already seems to have felt the same difficulty in the text to Ic. 1708-04. Cooke l. c. did not decide the point and he was satisfied with adding to his description of *H. subpubens*: 'Scarcely distinct from *H. Heyneana*.'

It was only in 1928 that Fischer when going through all the material relating to the two species for the preparation of pt. viii of Gambel's Flora

of Madras, took the decisive step and reduced *H. subpubens*. 'After a careful examination' he says, 'of a number of sheets I am unable to keep this species separate from *H. Heyneana* Lindl. All the features cited as distinctive by the several authors who keep them apart vary considerably and in some cases the characters mentioned do not agree with the descriptions and figures. I could find no one constant distinguishing feature and must combine the two under the older name of Lindley.' (Kew Bull. 1928, p. 284).

Description: See Cke. ii, 719 and 720.—We cannot do better than add Fischer's short characteristic taken from his key to the Madras Habenarias:

Plant 10-37 cm. high. Leaves subimbricate, sheathing, ovate or linear, acute, 2-6 cm. Spike 5-10 cm. long. Bracts cucullate, acuminate, sheathing the second flowers, lower 2.5 cm. long, smaller upwards. Sepals subequal, obtuse. Petals as long, narrower. Lip as long, 3-partite; side lobes linear, obtuse, usually shorter than the broader midlobe; spur subclavate, as long as or shorter than the beakless ovary.

Locality: *Konkan*: (Law, Dalzell); S. Konkan (Dalzell 78); Wary Country (Dalzell & Gibson).—*W. Ghats*: Lonavla (Hallberg 2650 !); Panchgani (Blatter & Hallberg B1687 !, Hallberg 26502 ! 26503 !, Blatter 1877 !); S. Ghats (Stocks 12); Castle Rock (Sedgwick 2762 bis ! 4184 !); Tinai Ghat (Talbot 2520 ! Herb. Calc.).—*Deccan*: (Stocks 60); Karli (Jacquemont 619); Purandhar (Bhide 1029 !).—*S. M. Country*: Dharwar (Law); Londa (Spooner !).—*N. Kanara*: Sirsi (Dalzell); without locality (Talbot 2520 !).

Flowers: Aug. 1917 and 1918 (Castle Rock); Sept. 1884 (Lonavla); Nov. 1918 (Sirsi).

Fruit: Oct. 1920 (Panchgani).

Distribution: Konkan, Deccan, S. M. Country, Kanara, W. Ghats of Bombay and Madras Pres., 2,500-8,000 ft.

19. ***Habenaria affinis*** Wight Ic. v, pt. i (1852) 13, t. 1707 (*non* Don); Kraenzl. Orchid. Gen. & Sp. i (1897) 324; Hook. f. F.B.I. vi, 149; Prain Beng. Pl. 1031; Cke. ii, 720; Haines Bot. Bih. & Or. 1157; Fischer Fl. Madras pt. viii (1928) 1471.

Description: Cke. ii, 720.—We have not seen this species.

Locality: *Deccan*: Purandhar (Woodrow).—*S. M. Country*: Belgaum (Ritchie 17).

Distribution: Bengal, Bihar, Central India, Deccan, S. M. Country, Nilgiri Hills, Anamalai Hills, Rampa Hills, 2,000-4,000 ft.

20. ***Habenaria ovalifolia*** Wight Ic. t. 1708 (*non* 1706); Fischer Fl. Madras, pt. VIII (1928), 1471.

Locality: *Konkan*: Hillside of Kanari Caves, in dense forest common (McCann 1152 !); Hills west of Mulland, in dense forest (McCann 1314 !).

Flowers: 15-9-29 (Kanari Caves); 11-8-29 (Hills W. of Mulland).

Fruit: 22-9-29 (Hills W. of Mulland).

21. ***Habenaria marginata*** Coleb. in Hook. Exot. Fl. (1825) t. 136; Grah. Cat. 201; Dalz. & Gibs. Bomb. Fl. 268; Kraenzl. Orchid. Gen. & Sp. i, (1897) 360; Hook. f. F.B.I. vi, 150; Prain Beng. Pl. 1031; Cke. ii, 721; Duthie in Ann. Roy. Bot. Calc. ix, pt. 2, 184, t. 136; Fl. Upp. Gang. Pl. iii, 226; Haines Bot. Bih. & Or. 1157; Fischer Fl. Madras pt. viii (1928) 1471.—*H. fusifera* Hook. f. F.B.I. vi, 147.

We have reduced *H. fusifera* Hook. f. following Fischer who has examined the type specimen in the Herb. Calc. and who is of opinion that it is identical with *H. marginata* Coleb.

Description: Cke: ii, 721.

Locality: *Konkan*: (Law, Dalzell); S. Konkan (Stocks 6); Karanja (Dalzell & Gibson); Uran, in Bombay Harbour (Dalzell); Trombay (Hallberg !); Boisar (Hallberg !); Vehar Lake (McCann !); Mulland (McCann !); S.-W. of Vehar Lake (McCann !).—*Deccan*: Junnar near Poona (Stocks); Poona (Hallberg !); Kharkala, Poona Dist. (Hallberg 26496 !); Purandhar (Woodrow).—*S. M. Country*: Dharwar, common in dampish pasture land, usually in pure association of *Vetiveria Lawsoni* Blatter & McCann (Sedgwick 6207 bis ! 2800 ! 2674 !).—*N. Kanara*: Near Karwar, grassland, sea level (Sedgwick 6727 ! 6543 !); forest near Yellapur (Talbot !); Supa, wayside (Talbot !); Guddehalli, near Karwar (Sedgwick 5155 !).

Distribution: W. Himalaya, from Kashmir to Kumaon, up to 7,000 ft., Bengal, Burma, Bihar, Mt. Abu, Bombay Pres., Madras Pres.: W. Ghats, 1,500-3,000 ft., Nallamalai Hills at 1,500 ft.

Flowers: July 1917 (Dharwar); Aug. 1917 (Dharwar and Baisar); Sept. 1926 (Vehar Lake); Oct. 1919 (Karwar); Oct. 1882 (Yellapur); Oct. 1885 (Supa).

Forma flavescens Blatter & McCann.—*Habenaria flavescens* Hook. f. F.B.I. vi. 150; *var. flavescens* Th. Cooke Fl. Bomb. Pres. ii, 721.

Description: Cke. l. c.

Locality: Konkan (Law).

22. **Habenaria Hallbergii*** *sp. nov.* Blatter & McCann.

[*Sect. Trimeroglossa. Similis Habenariae ovalifoliae* Wight, *sed recedit ab ea bracteis lanccolato-subulatis quam flores longioribus, calcare paulum curvato lineari turtuoso, aliquantulum compresso apice clavato, labelli lobis aequilongis, lateralibus anguste linearibus rigidis patentibus, glandulis angustis longissimis*].

Description: Stem stout, up to 30 cm. high. Leaves 4-5, clustered near the base, sessile, amplexicaul, sheathing with a stout midrib, large, 20 by 5 cm., ovate-oblong, acuminate, many-nerved, glabrous. Several long-acuminate green appressed sheaths above, 4 by 2.5 cm., passing into bracts, with a decurrent midrib and slightly decurrent base, so that the stem is angular, especially below the spike, half amplexicaul. A smaller leaf about half way up the stem. Bracts 2.2 cm. by 1.8 mm., narrowly lanceolate-subulate, long-acuminate, with strongly decurrent midrib and base, overtopping the flower. One spike. Sepals green, ovate, obtuse, subequal in length, dorsal slightly broader, hooded, lateral spreading, all 3-nerved, with a narrow membranous margin, nerves ending before reaching the tip. Petals connivent with dorsal sepal and also at the tips with midlobe of lip, lip inflexed. Petals fleshy, yellowish green, 1-nerved, subfalcately oblong, truncate or slightly emarginate at apex, base oblique. Lip fleshy, deeply 3-lobed; lateral lobes narrow linear, acute, stiff, spreading, slightly longer than the sepals; midlobe truncately obtuse at apex, subtriangular, with the base contracted, as long as side lobes, 4 by 2.5 mm. Spur greenish, longer than ovary, slightly curved, linear and parallel to it in its upper part, twisted, slightly compressed and clavate in its lower, tip acute. Rostellum green, short but very conspicuous on account of the very large fleshy basal lobes. Connective slightly emarginate, green, cells distinct, membranous, basal folds short. Pollinia yellow with large grains, long-stalked, stalk naked (on account of the short anther-tubes); gland very long and narrow, situated on the inner surface of the basal lobes of the rostellum in channels pointing parallel to the axis of the flower; the stalk is attached to the outer part of the gland, but leaving a small free end visible from outside. Stigmatic lobes greenish, clavate, not much longer than the basal lobes of the rostellum; between them at the base above mouth of spur a small caruncle not closing the narrow opening.

The stalk of the pollinia is articulated with the gland so that, when released, the pollinia spring forward, the stalk taking its position along the longer (inner) end of the gland. An insect intruding its head between the rostellar arms would get the glands attached along the sides of its head and thorax parallel with its body, while the pollinia point straight forward.

Locality: W. Ghats: Khandala, in ravine (Hallberg! in Herb. St. X.C. type).—Also in Salsette, Konkan (Hallberg!).

In bud: July.

In flower: August.

23. **Habenaria viridiflora** R. Br. Prodr. 312 Lindl. Gen. & Sp. Orchid. 319; Wight Ic. t. 1705.

Var. Dalzellii Hook. f. F.B.I. vi (1890) 150; Cke. ii, 721.—*Coeloglossum luteum* Dalz. in Kew Journ. Bot. ii (1850) 263; Dalz. & Gibs. 269.

Description: Cke. l. c.

Locality: Konkan (Stocks 36); Malwan (Dalzell & Gibson).—We have never seen this species; seems to be very rare.

* Named after the late Prof. F. H. Halberg for many years our colleague.

24. **Habenaria crassifolia** A. Rich. in Ann. Sc. Nat. sér. 2, xv (1841), 72, t. 3, C; Kraenzl. Orchid. Gen. & Sp. i (1897) 344; Hook. f. F. B. I. vi, 151; Cke. ii, 722; Fischer Fl. Madras pt. viii (1928) 1471.—*Platanthera brachyphylla* Lindl. Gen. & Sp. Orchid. (1835) 293; Wight Ic. t. 1694; Dalz. & Gibs. Bomb. Fl. 269.

Description: Cke. 1.c.—In Panchgani specimens the leaves measure up to 7.5 cm., and the racemes up to 22.5 cm.

Locality: Konkan (Stocks, Law).—*W. Ghats*: Panchgani, Tiger Path and Fairy Spring (Blatter P72! 210!, McCann!); Mahableshwar (Cooke!, Hallberg B1688! 26500!, Sedgwick 7444 bis!, McCann!).—*Deccan*: Junnar Hill, near Poona (Stocks 77); Purandhar (Woodrow!, Bhide!); Singhar (Garade 57!).

Distribution: Konkan, Deccan, W. Ghats, Nilgiri and Pulney Hills, 6,000-7,000 ft.

Flowers: Aug. 1925 (Panchgani); Sept. 1921 (Mahableshwar); Oct. 1920 (Mahableshwar).

25. **Habenaria diphylla** Dalz. in Kew Journ. Bot. ii (1850) 262; Dalz. & Gibs. Bomb. Fl. 268; Kraenzl. Orchid. Gen. & Sp. I (1897) 346; Hook. f. F.B.I. vi, 151; Prain Beng. Pl. 1031; Duthie in Ann. Roy. Bot. Gard. Calc ix, pt. 2, 185, t. 137; Cke. ii, 722; Haines Bot. Bih. & Or. 1158; Fischer Fl. Madras pt. viii (1928) 1471.—*H. Jerdoniana* Wight Ic. t. 1715.—*Liparis diphyllus* Nimmo in Grah. Cat. Bomb. Pl. 252.

Locality: Konkan: (Stocks, Dalzell); S. Konkan (Nimmo).—*N. Kanara*: (Law); Guddehalli (T. R. Bell 3042!, Talbot 1916!); Karwar (Talbot 586!); Balikeri near Karwar (T. R. Bell 7874!).

Distribution: Outer ranges of W. Himalaya in Garhwal, eastwards to Bengal, Chota Nagpur, Orissa, Konkan, N. Kanara, W. Coast of Madras Pres. from Kanara to Travancore at low elevations.

Flowers: July 1882 (near Karwar); Aug. 1882, 1886, 1889, 1920 (near Karwar); Sept. 1917 (N. Kanara).

SUMMARY

Cooke has mentioned 75 species of Orchids indigenous in the Bombay Presidency, classed under 31 genera.

In the preceding articles 7 genera have been added not known in the Presidency before: *Desmotrichum*, *Pachystoma*, *Calanthe*, *Chilochista*, *Saccolabium*, *Epipogum* and *Tropidia*; of species 20 have been observed for the first time in our area.

Owing chiefly to assiduous collecting in N. Kanara over a period of many years and careful notes by Mr. T. R. D. Bell, late Chief Conservator of Forests, Bombay Presidency, and helped by beautiful paintings by Miss Evangeline Bell, we have been able to describe 29 new species. Thus bringing up the total number of Bombay Orchids to 124, belonging to 37 genera. We must not forget to mention our friend the late Professor F. Hallberg to whom we have to be grateful for many valuable observations and suggestions.

We subjoin at the end a list of all the genera adopted in our paper, each with the reference to the volume and page in our series.

Key to all the genera of Bombay Orchids. (after Cooke).

- A. Pollinia waxy
 I. Pollinia 4
- | | | | | |
|------------------------------------|------------------------------------|-----------------|-----|-------------------------|
| 1. Leaves equitant | ... | ... | ... | 1. <i>Obcronia</i> . |
| 2. Leaves not equitant | | | | |
| a. Terrestrial or epiphytic herbs. | Leaves | | | |
| | membranous, usually sessile. | Inflor- | | |
| | escence terminal. | escence | | |
| | small, in racemes or spikes. | rather | | |
| | prolonged below into a foot | small, | | |
| | * Lip with basal auricles. | Column | | |
| | very short with broad arms. | prolonged | | |
| | Terrestrial | below | | |
| | ... | into | | |
| | ... | a | | |
| | ... | foot | | |
| | ** Lip without basal auricles. | * Lip | | |
| | long with callosities or wings, or | with | | |
| | both. Rostellum sometimes double. | basal | | |
| | Terrestrial or epiphytic | auricles. | | |
| | ... | Column | | |
| | | long | | |
| | | with | | |
| | | callosities | | |
| | | or wings, | | |
| | | or | | |
| | | both. Rostellum | | |
| | | sometimes | | |
| | | double. | | |
| | | Terrestrial | | |
| | | or epiphytic | | |
| | | ... | | |
| | | | | 2. <i>Microstylis</i> . |
| | | | | |
| | | | | 3. <i>Liparis</i> , |

b. Epiphytic herbs. Leaves chartaceous or coriaceous. Column more or less prolonged below into a foot

* Stems solitary or caespitose or composed of discrete pseudobulbs basally attached on a short or long rhizome

§ Flowers from the stems or pseudobulbs, terminal or axillary, solitary, or on short few-flowered peduncles or in few- or many-flowered racemes, usually large and showy

† Rhizome short, stemless with a single pseudobulb or pseudobulbs plurinodal ...

4. *Dendrobium*.

†† Rhizome long, annulate, stem nodose, bearing uninodal pseudobulbs ...

5. *Desmotrichum*.

§§ Flowers from lateral scapes rising from the base of the pseudobulbs, or from the rhizome between them, solitary or in heads, umbels or racemes

† Lateral sepals alongside or under the lip. Flowers racemose or spicate or umbellate ...

6. *Bulbophyllum*.

†† Lateral sepals spreading. Scape 1-flowered ...

7. *Trias*.

** Stems jointed, composed of elongated pseudobulbs strung on a woody core. Flowers in racemes

8. *Pholidota*.

*** Stemless tufted herbs. No pseudobulbs. Flowers in panicles ...

9. *Josephia*.

II. Pollina 8.

1. Epiphytic pseudobulbous herbs, usually small. Inflorescence lateral or terminal, racemose or capitate. Flowers with a mentum. Column prolonged below into a foot. Lip incumbent on the foot of the column

a. Sepals connivent at the base, all or the lateral only connate. Pseudobulbs small, discoid, reticulate ...

10. *Porpax*.

b. Sepals and petals free. Pseudobulbs not discoid ...

11. *Eria*.

2. Terrestrial herbs; rhizome nodose ...

12. *Pachystoma*.

3. Epiphytic or terrestrial herbs. Stems not pseudobulbous, slender or equally thickened along their whole length. Leaves distichous ...

13. *Thunia*.

4. Terrestrial herbs, often pseudobulbous with a short or tall leafy stem. Leaves plaited. Flowers usually pale or dark purple ...

14. *Calanthe*.

III. Pollina 2

1. Stem pseudobulbous or tuberous at the base

a. Terrestrial herbs. Flowers in pedunculate racemes. Leaves plicate

* Lip distinctly 3-lobed, saccate or spurred at the base. Inflorescence strict ...

15. *Eulophia*.

- ** Lip obscurely 3-lobed, wide ventricose, but not spurred at the base. Inflorescence at first decurved ... 16. *Geodorum*.
- b. Epiphytic herbs with long linear sheathing leaves on usually a large fleshy pseudobulb. Lobes of the lip embracing the unwinged column ... 17. *Cymbidium*.
2. Stem not pseudobulbous nor tuberous at the base
- a. Column prolonged into a foot
- * Spur erect or parallel to the blade of the lip, pointing forwards; lip adnate to the produced foot of the column; side lobes of lip erect; foot of column long ... 18. *Sarcochilus*.
- ** Spur saccate. Lip movable on the foot, side lobes of lip erect. Column very short ... 19. *Chilochista*.
- *** Spur saccate, laterally compressed. Side lobes of lip 0; foot of column small ... 20. *Rhynchostylis*.
- **** Spur conical, usually more or less elongated, erect or curved under the midlobe of the lip; foot of column large ... 21. *Aerides*.
- b. Column not prolonged into a foot
- * Lip not spurred nor saccate
- § Leaves terete. Flowers in short spikes. Caudicle of pollinia broad ... 22. *Luisia*.
- §§ Leaves lorate. Flowers in racemes with very long simple or branched peduncles. Caudicle of pollinia long, narrow ... 23. *Cottonia*.
- ** Lip spurred or saccate
- § Side lobes of lip large. Flowers large ... 24. *Vanda*.
- §§ Side lobes of lip small or 0
- † Spurs 2, collateral ... 25. *Diplocentrum*.
- †† Spur or sac single
- ‡ Spur not septate within ... 26. *Acampe*.
- ‡‡ Spur septate within ... 27. *Sarcanthus*.
- ‡‡‡ Spur naked within or with calli on the front wall only ... 28. *Saccolabium*.
- B. Pollinia powdery or lamellate, never waxy
- I. Anther terminal. Pollinia 2 or 4, cohering by their sides, without either gland or caudicle. Leaf solitary, mostly appearing after the flowers ... 29. *Nervilia*.
- II. Anther posticous. Pollinia 2
1. Sepals narrow, free. Lip concave, saccate or shortly spurred at the base. Column short. Leafless herbs ... 30. *Epipogon*.
2. Lateral sepals connate, forming a mentum. Lip sessile. Column short, dense-flowered ... 31. *Tropidia*.
3. Dorsal sepal and petals together forming a hood. Lip sessile. Spike lax- or dense-flowered ... 32. *Spiranthes*.
4. Sepals free, dorsal with the petals cohering in a hood. Column without appendages. Lip adnate to the base of the column ... 33. *Zeuxine*.

5. Sepals connate to the middle into a tube 34. *Cheirostylis*.
- III. Anther-cells sessile on the column, remote or contiguous, always discrete. Pollinia 2, sometimes 2-partite
1. Sepals subequal and more or less connivent 35. *Peristylus*.
2. Sepals unequal, the lateral ones more or less spreading
- a. Stigmas sessile or subsessile, confluent or more or less distinct 36. *Platanthera*.
- b. Stigmas more or less distinctly stalked, very rarely confluent 37. *Habenaria*.

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(To be continued.)